Ecological site R019XI102CA
Shallow uplands 13-24" p.z.

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Eriogonum arborescens* (2) *Eriogonum grande var. grande*
Herbaceous	(1) *Nassella*

Physiographic features

This ecological site is found on the backslopes of hills and mountains on slopes ranging from 15 to 75 percent. The elevations range from 49 to 2440 feet, and it is found on all aspects.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Mountain
Flooding frequency	None
Ponding frequency	None
Elevation	15–744 m
Slope	15–75%

Aspect	Aspect is not a significant factor

Climatic features

This ecological site is found only on Santa Cruz Island, and due to its size, the temperature and precipitation ranges have been grouped together to capture the entire island's variance.

The average annual precipitation is 19 inches with a range between 13 and 24 inches, mostly in the form of rain in the winter months (November through April). The average annual air temperature is approximately 56 to 73 degrees Fahrenheit, and the frost-free (>32F) season is 320 to 365 days.

Table 3. Representative climatic features

Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	610 mm

Influencing water features

This site is not influenced by wetland or riparian water features.

Soil features

These soils formed in residuum from schist (Delphine) or in residuum from volcanic breccia, andesite, or basalt (Spinnaker). They are shallow to bedrock, well-drained or somewhat excessively drained, with loamy surface and subsurface textures. Mean annual soil temperatures (MAST) range from 59 and 71 degrees F, and are classified as thermic.

This ecological site is found in the following map units on these soil components:

SSA Map symbol Component

CA688 101 Spinnaker
CA688 240 Delphine
CA688 241 Delphine
CA688 250 Spinnaker
CA688 251 Spinnaker
CA688 260 Spinnaker
CA688 270 Spinnaker
CA688 271 Spinnaker

Table 4. Representative soil features

Surface texture	(1) Gravelly (2) Extremely gravelly (3) Very gravelly
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately slow to moderately rapid
Soil depth	15–46 cm
Surface fragment cover <=3"	60%
Available water capacity (0-101.6cm)	1.52–4.32 cm
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.6–7.3
Subsurface fragment volume <=3" (Depth not specified)	40–70%

Ecological dynamics

This ecological site is found primarily on shallow soils on the interior ridge tops on very steep slopes and rock outcrops. The shallow rocky soils of this site have low water holding capacities that will generally inhibit germination and plant growth, which determines the species composition of this plant community and maintains the site as a sparsely vegetated, rocky habitat.

The historical state is sparsely vegetated with common plants including Santa Cruz Island buckwheat (*Eriogonum arborescens*), redflower buckwheat (*Eriogonum grande* var. grande), dove weed (*Croton setigerus*), island broom (*Lotus dendroideus*), threeawns (Aristida spp.) and needlegrasses (Nassella spp.). The reference state is similar to the historical state, except the herbaceous cover is dominated by non-native annual species such as oats (Avena spp.) and bromes (Bromus spp.). In the reference state, the native grasses have a scattered cover due to the invasiveness of the non-native species.

The natural successional cycle for this ecological site is driven primarily by patchy disturbances that may affect small portions of the site but rarely the entire site. Sites that are on these exposed, rocky ridges may experience rock or land slides that could

potentially disturb the vegetation, opening the site for new buckwheats and grasses to establish. Several years of drought could also affect the site, by causing many of the plants to die over large areas. Once the drought ends, the species would begin to reestablish from the local seedbank.

The invasion of non-native annuals into this site can also shift the successional patterns by bringing fire disturbance into the system. Fire was not likely an issue in the natural system, given the sparse nature of the plants on rocky, exposed ground. Larger patches may have burned, but likely would not have spread beyond that patch. The non-native annuals that have invaded the system provide a continuous fuel source for fires to spread throughout the site, burning out large expanses of the native vegetation. Frequent fires can completely remove many of the native species from the site by removing seed sources. After a fire, the non-native annuals will be extremely competitive during germination and establishment, and will outcompete many of the natives that attempt to reestablish.

Overgrazing by domestic livestock and non-native wildlife can also disrupt the natural disturbance regime of this site. Overgrazing causes chronic, severe defoliation of the buckwheats and native grasses and could facilitate the invasion by non-native annual grasses and forbs into the site.

State and transition model

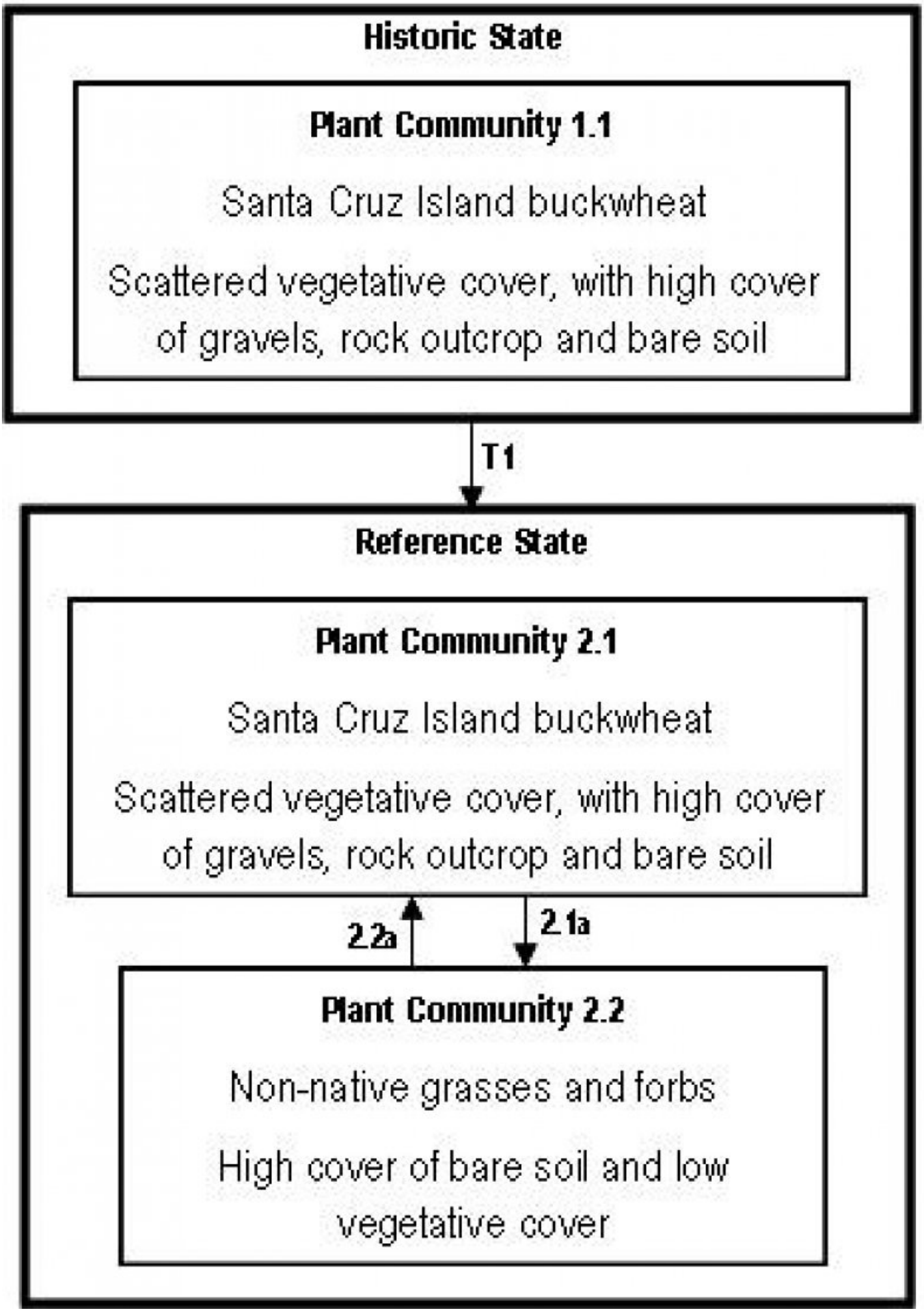
Historic State
Plant Community 1.1
Santa Cruz Island buckwheat
Scattered vegetative cover, with high cover of gravels, rock outcrop and bare soil
T1
Reference State
Plant Community 2.1
Santa Cruz Island buckwheat
Scattered vegetative cover, with high cover of gravels, rock outcrop and bare soil
2.2a
2.1a
Plant Community 2.2
Non-native grasses and forbs
High cover of bare soil and low vegetative cover

Figure 3. State Transition Model

State 1
Reference State - Plant Community 2.1

Community 1.1
Reference State - Plant Community 2.1

Figure 4. Santa Cruz Island Buckwheat

The reference state and is similar to the historic state and is dominated by scattered cover of Santa Cruz Island buckwheat (*Eriogonum arborescens*), redflower buckwheat (*Eriogonum grande* var. grande), and island broom (*Lotus dendroideus*). Unlike the historic state, the primary herbaceous dominant species are now non-native annual species such as longbeak stork's bill (*Erodium botrys*), oats (Avena spp.), and bromes (Bromus spp.). The other species, tussockgrass (Nassella spp.), island bristleweed (*Hazardia detonsa*), and cudweeds (Gnaphalium spp.), are still present but no longer exhibiting the same cover and dominance that they likely would have in the historic state. Overall plant cover is still low, between 10 to 25 percent, with gravel, rock, bare soil, and bedrock outcrop covering the other 75 and 90 percent. There are still some biological soil crusts on the soil and gravel surfaces in some areas. Community Pathway 2.1 a: The shift from PC 2.1 to PC 2.2 occurs under both the chronic, severe defoliation by introduced domestic livestock and non-native ungulates, and a more frequent fire regime. The grazing can cause the community to become vulnerable to the invasion of non-native annuals. The continuous removal of the native vegetation’s foliage eventually kills the plants completely, releasing many of the nutrients back into the system making them available for other species like the non-native annuals. Fire also becomes more of a threat to this ecological site, as the non-native species grow and begin providing a continuous fuel source. The invasive plants will fill-in many of the otherwise open patches between shrubs on the site. Once the shrub species are removed by a fire, the non-native annuals will compete heavily with shrub seedlings, and will eventually lock up all the available nutrients for themselves, killing all the shrubs from the seedbank and taking over the entire site.

Forest understory. The percent composition by frequency table is entered as percent cover values.

Table 5. Soil surface cover

Tree basal cover	0-1%
Shrub/vine/liana basal cover	10-25%
Grass/grasslike basal cover	5-20%
Forb basal cover	5-15%
Non-vascular plants	1-3%
Biological crusts	1-30%
Litter	5-20%
Surface fragments >0.25" and <=3"	30-75%
Surface fragments >3"	5-15%
Bedrock	10-40%
Water	0%
Bare ground	5-25%

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	–	–	10-20%	5-15%
>0.15 <= 0.3	–	5-15%	10-30%	1-3%
>0.3 <= 0.6	–	10-25%	10-20%	1-3%
>0.6 <= 1.4	–	–	–	–
>1.4 <= 4	–	–	–	–
>4 <= 12	–	–	–	–
>12 <= 24	–	–	–	–
>24 <= 37	–	–	–	–
>37	–	–	–	–

State 2
Plant Community 2.2

Community 2.1
Plant Community 2.2

This state is dominated by a very low cover of non-native species over open areas of rock and gullies. They exhibit minimal vigor, in comparison to other areas on the Islands. Common species include longbeak stork's bill (*Erodium botrys*), oats (Avena spp.), and bromes (Bromus spp.). Community Pathway 2.2 a: The shift from PC 2.2 back to PC 2.1 will occur if the chronic, severe defoliation is removed from the site, which would allow time for nearby buckwheats and other species to reestablish the site from nearby seed sources. Note: No data was collected for this plant community.

State 3
Historic State - Plant Community 1.1

Community 3.1
Historic State - Plant Community 1.1

The historical state would have been dominated by scattered cover of Santa Cruz Island buckwheat (*Eriogonum arborescens*), redflower buckwheat (*Eriogonum grande* var. grande), and island broom (*Lotus dendroideus*). Other common plants include tussockgrass (Nassella spp.), island bristleweed (*Hazardia detonsa*), and cudweeds (Gnaphalium spp.). Overall plant cover is low, between 10 to 25 percent, with gravel, rock, bare soil, and bedrock outcrop covering the other 75 and 90 percent. There would have been a high percentage of biological soil crusts on the non-vegetated soil surface and on much of the gravel surfaces. Transition 1: The historic state will transition to the reference state as non-natural disturbances cause major shifts in the natural successional patterns of the site. The overgrazing of domestic livestock and non-native wildlife can disrupt the natural disturbance regime of the plant community, causing severe defoliation of the buckwheats and native grasses and facilitating the invasion of non-native annual grasses and forbs. These non-native grasses and forbs may make fire disturbance more likely by providing a continuous fuel source for fires to spread throughout the site, burning out large expanses of the native vegetation. Frequent fires can completely remove many of the native species from the site by removing seed sources. After a fire, the non-native annuals will be extremely competitive during germination and establishment, and will outcompete many of the natives that attempt to reestablish.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Shrub/Vine					
1	**shrubs**			39–1233	
	redflower buckwheat	ERGRG5	*Eriogonum grande var. grande*	1–673	–
	Santa Cruz Island buckwheat	ERAR6	*Eriogonum arborescens*	34–560	–
	dove weed	CRSE11	*Croton setigerus*	0–22	–
	island broom	LODE2	*Lotus dendroideus*	1–11	–
Grass/Grasslike					
2	**grasses**			34–224	
	threeawn	ARIST	*Aristida*	0–112	–
	oat	AVENA	*Avena*	11–112	–
	needlegrass	NASSE	*Nassella*	11–78	–
	red brome	BRRU2	*Bromus rubens*	11–39	–
	annual fescue	VUMY	*Vulpia myuros*	0–11	–
	soft brome	BRHO2	*Bromus hordeaceus*	0–11	–
Forb					
3				1–84	
	island bristleweed	HADE4	*Hazardia detonsa*	0–56	–
	pricklypear	OPUNT	*Opuntia*	0–17	–
	spikemoss	SELAG	*Selaginella*	0–6	–
	cudweed	GNAPH	*Gnaphalium*	0–6	–
	longbeak stork's bill	ERBO	*Erodium botrys*	0–2	–
	smooth cat's ear	HYGL2	*Hypochaeris glabra*	0–1	–

Animal community

This ecological site has steeper slopes and bare ground and so is not utilized by many animal communities; however small rodents and birds may use it for cover and food.

Hydrological functions

N/A

Recreational uses

N/A

Wood products

N/A

Other products

N/A

Other information

N/A

Inventory data references

The following NRCS plots were used to describe this ecological plot.

SC-355A lbs
SCV-102 lbs
SCV-103 %
SC-379 %
SCV-6 lbs- Site location

Type locality

Location 1: Santa Barbara County, CA	
UTM zone	N
UTM northing	3765595
UTM easting	0244469
General legal description	The site location is on Santa Cruz Island, about 1000' from the South Ridge Road, on the east side of the Willows Canyon Road.

Other references

Junak, Steve; Ayers, Tina; Scott, Randy; Wilken, Dieter; and Young, David (1995). A Flora of Santa Cruz Island. Santa Barbara Botanic Garden, Santa Barbara, CA.

Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

   _____

3. **Number and height of erosional pedestals or terracettes:**

   _____

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

   _____

5. **Number of gullies and erosion associated with gullies:**

   _____

6. **Extent of wind scoured, blowouts and/or depositional areas:**

   _____

7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

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17. **Perennial plant reproductive capability:**
